

14.

The Occurrence of Leeches, *Ozobranchus branchiatus*
(Menzies), on Fibro-Epithelial Tumors of
Marine Turtles, *Chelonia mydas* (Linnaeus).

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(Plates I-III).

In the course of study on parasites of *Chelonia mydas*, Nigrelli (1941) reported the presence of large numbers of leeches, *Ozobranchus branchiatus* (Menzies, 1791), on fibro-epithelial tumors removed from turtles caught off the West Coast of Florida and sent to us by Mr. Stewart Springer. The leeches were previously described from the same host by MacCallum and MacCallum (1918) but these investigators did not mention the tumors.

The tumor masses were removed from the neck and eyelids of turtles and on a piece one-half inch square as many as fifty leeches in various stages of growth were counted. The largest of these ectoparasites measure about 10 mm. in length and 5 mm. in width (Fig. 1). They are strongly contracted as the result of preservation, and it is assumed that when alive and fully expanded they must be at least three times as long. There is a powerful sucker at the posterior end of the animal and the body possesses lateral filaments which are described as gills (Fig. 1, G). The mouth is small, round in shape and furnished with smooth thick lips. On the dorsal side of the anterior region may be found two eye spots (Fig. 2), although these structures are not always demonstrable. An examination of the intestinal contents shows that these annelids feed almost entirely on the blood of the host.

The tumors are of the same type described by Smith and Coates (1938). The tissues appear as papillary growths or as round fibromata arising from the skin. The leeches are attached to the tumors by their posterior suckers and on the papilloma they are usually found buried deep in the crypts formed by such growths (Fig. 2). In many instances it is difficult to distinguish be-

tween the growth proper and the leeches (Fig. 3).

Microscopically, the papilloma shows a definite thickened epithelium with a certain amount of keratin formation (Figs. 5, 6, 7). The stroma is highly vascular, especially in regions where the leeches are attached (Fig. 7). The fibromata is characterized by a dense, intermingling fibrous growth, covered at the surface with a normal amount or slightly thickened epithelium. Nests of leeches also have been found attached on these smooth growths (Fig. 4).

The etiology of the growths is still unknown. Smith and Coates (1938) discuss the possibility of a viral or parasitic agent. Later (1939) they reported the presence of trematode eggs in many of the tumors examined. These eggs were eventually identified by Smith, Coates and Nigrelli (1941) as those of blood flukes originally described by Leared (1862) as *Distomum constrictum*. According to Smith and Coates (1939), "It is probable that ova are deposited in pre-existing vascular tumor tissue by the migrating blood flukes, and remain there without affecting the subsequent course of the growth." They pointed out, further, that the localization of ova in the stroma and in the venous or lymphatic spaces of the turtle tumors is somewhat similar to the condition in the tissues of the urinary bladder in human bilharziasis. "Such an infection of the human bladder, as is well known, may result in papillomatous and malignant changes."

Just what role the ectoparasitic annelids play in the development of these turtle tumors is not certain. They may act as vectors for viral or other parasitic forms that may be the causative agent, although histological

examination of a number of sectioned and stained leeches showed no evidence that they are involved in the transmission of helminthic parasites of the turtles. However, it is altogether possible that the leeches may have some effect on the subsequent growth of the fibro-epithelial tumors. It is known that they feed on the turtle's blood; the latter is prevented from clotting by the action of hirudin. Such a continued flow of blood makes an excellent medium, supplying the necessary nutriment for these slow growing tumor cells. That hirudin, *per se*, may have some effect on the growths is indicated by certain experiments reported in the literature involving the use of heparin. Thus, Ligneris (1930) found that transplantations of melanoma of angora goat on homologous animals were successful only when heparin-goat-plasma was used as a nutritive and protective medium surrounding the transplanted tumor particles. Zakrzewski (1932) showed that better proliferation of tissues was obtained when heparin was added to blood serum used as the culture medium.

SUMMARY.

1. Leeches, *Ozobranchus branchiatus* (Menzies, 1791), were found associated with fibro-epithelial tumors of marine turtles, *Chelonia mydas* (Linnaeus).

2. The role of the buccal secretion of the leeches (hirudin) is discussed in connection with the growth of the tumor tissues.

REFERENCES.

- LIGNERIS, M. J. A.
1930. The use of Heparin-Plasma for grafting of spontaneous mammalian tumors into Homologous Animals. *British J. Exp. Path.*, 11: 249-251.
- MACCALLUM, W. G. AND G. A. MACCALLUM.
1918. On the Anatomy of *Ozobranchus branchiatus* (Menzies). *Bull. Amer. Mus. Nat. Hist.*, 38: 395-408.
- NIGRELLI, ROSS F.
1941. Parasites of the Green Turtle, *Chelonia mydas* (L), with Special

Reference to the Rediscovery of Trematoda Described by Looss from This Host Species. *J. Para.*, 27: 15-16.

- SMITH, G. M. AND C. W. COATES.
1938. Fibro-Epithelial Growths of the Skin in Large Marine Turtles, *Chelonia mydas* (Linnaeus). *Zoologica*, 23: 93-98.
1939. The Occurrence of Trematode Ova, *Hapalotrema constrictum* (Leared), in Fibro-Epithelial Tumors of the Marine Turtle, *Chelonia mydas* (Linnaeus). *Zoologica*, 24: 279-382.
- SMITH, G. M., C. W. COATES AND R. F. NIGRELLI
1941. A Papillomatous Disease of the Gallbladder Associated with Infection by Flukes, Occurring in the Marine Turtle, *Chelonia mydas* (Linnaeus). *Zoologica*, 26:13-16.
- ZAKRZEWSKI, Z.
1932. Die Rolle des Prothrombins und Heparins bei der Proliferation und Differenzierung von Geweben. Untersuchungen in vitro. *Arch. Exp. Zellforsch. bes. Gewebezücht.*, 13: 152-175.

EXPLANATION OF THE PLATES.

PLATE I.

- Fig. 1. Photograph of leeches removed from turtle tumors. **G**, gill filaments; **S**, posterior sucker. About 4 ×.
Fig. 2. Leeches buried in papilloma crypts. Note minute eye spots. About 3 ×.

PLATE II.

- Fig. 3. Nest of leeches among the papillae. Some of the smaller leeches are difficult to distinguish from growth proper. 3 ×.
Fig. 4. Nest of leeches, in various stages of development, on smooth fibromata of the turtle.

PLATE III.

- Figs. 5, 6, 7. Photomicrographs of the turtle tumor. Note relationship of leech to tumor. The stroma of the tumor is highly vascular. About 5 ×.